

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A weldable fastener for welding to a metal surface comprising:

a fastener head having a first head thickness between a head top surface and head bottom surface;

an externally threaded shank disposed on the top surface; and

an annular weldment area disposed on the bottom surface having a second head thickness between the head bottom surface and a flat annular weldment surface, said second head thickness being less than 50% the first head thickness, wherein said annular weldment area, said bottom surface, and metal surface define a non-welded cavity upon the welding of said annular weldment area to the metal surface.

2. (Previously Presented) The weldable fastener according to Claim 1 wherein said head has an exterior wall having a first exterior radius and said annular weldment area has a second exterior radius equal to the first exterior radius.

3. (Cancelled)

4. (Previously Presented) The weldable fastener according to Claim 1 wherein said shank comprises a weakened section position adjacent to said head.

5. (Original) The weldable fastener according to Claim 1 wherein the second head thickness is about 20% to about 35% of the first thickness.

6. (Original) The weldable fastener according to Claim 1 wherein the first head thickness is greater than 1.5 mm.

7. (Original) The weldable fastener according to Claim 1 wherein the first head thickness is greater than 2.0 mm.

8. (Currently Amended) A stud to structure construction comprising:
a weldable fastener having a member having a top surface and a bottom surface with a first thickness there between, and ~~a flat~~ an annular weldment area disposed on the bottom surface having a second thickness between ~~[[an]]~~ a flat annular weldment surface and the ~~member~~ bottom surface which is less than 50% the first thickness;

an externally threaded shank coupled to the top surface; and

an annular weldment disposed between and coupling the weldable fastener to the structure, said annular weldment defining a non-welded cavity between the bottom surface and the structure.

9. (Cancelled)

10. (Previously Presented) The stud to structure construction according to Claim 8 wherein the member comprises a web portion.

11. (Original) The stud to structure construction according to Claim 10 configured such that the shank has a first failure load, and the web has a second failure load greater than the first failure load.

12. (Original) The stud to structure construction according to Claim 11 wherein the annular weldment has a third failure load greater than the first failure load.

13. (Previously Presented) The stud to structure construction according to Claim 12 further comprising a nut defining an exterior groove configured to fracture at a fourth failure load, said fourth failure load being less than the third failure load.

14. (Original) The stud to structure construction according to Claim 10 wherein the structure is a metal laminate.

15. (Original) The stud to structure construction according to Claim 14 wherein the metal laminate comprises a polymer layer.

16. (Original) The stud to structure construction according to Claim 15 wherein the laminate comprises first and second metallic layers, said polymer layer being disposed between the first and second layers.

17. (Previously Presented) The stud to structure construction according to Claim 16 wherein the weldment area is partially disposed between the first and second metallic layers.

18. (Currently Amended) ~~[[The]]~~ A stud to structure construction comprising:

a metal laminate comprising a polymer layer disposed between first and second metallic layers;

a fastener head having a first head thickness and a web portion;

an annular weldment area having a second head thickness, said second head thickness being less than the first head thickness, said annular weldment area having a first exterior radius, and said fastener head has an exterior wall having a second exterior radius equal to the first exterior radius, and a flat weldment surface prior to welding;

a solid cylindrical shank coupled to the web portion, said shank having an exterior surface, a portion of the exterior surface being threaded; and

an annular weldment disposed between and coupling the weldable fastener to the metal laminate, wherein the shank has a first failure load, and the web has a second failure load greater than the first failure load, and wherein the annular weldment has a third failure load greater than the first failure load, wherein the weldment is partially disposed between the first and second metallic layers, wherein the polymer layer is within the annular weldment area to laminate interface, and wherein the polymer

layer couples the first and second metallic layers, said annular weldment defining a circular cavity defined between the web portion and the laminate.

19. (Withdrawn) A method of coupling a threaded shank to a structure comprising:

providing a head coupled to the threaded shank, said head having a first thickness and an annular weldment portion, said annular weldment portion having a second thickness less than the first thickness;

positioning the annular weldment portion so as to contact the structure;

loading the annular weldment portion with an electric current;

withdrawing the annular weldment portion from the structure to form an arc to create molten metal; and

plunging the head into the molten metal to form a stud to structure interface.

20. (Withdrawn) The method according to Claim 19 wherein providing a head is providing an annular weldment portion having a thickness of about 20% to about 35% of the first thickness.

21. (Withdrawn) The method according to Claim 19 wherein loading the weldment portion with an electric current is loading the weldment portion with less than 950 amps.

22. (Withdrawn) The method according to Claim 19 wherein withdrawing the head is withdrawing the head for greater than 50 milliseconds.

23. (Currently Amended) A weld fastener for welding to a metal surface comprising:

a longitudinally elongated shank;

a laterally enlarged head extending from an end of the shank having a head thickness; and

a substantially annular weldment section longitudinally extending from the head opposite the shank, said annular section having a thickness which is 20% to 35% of the head thickness;

wherein a welding ~~edge~~ surface of the annular section is substantially flat along a lateral plane substantially parallel to a lateral plane of the head, prior to welding, and wherein said annular weldment section defines a circular non-welded cavity between the metal surface and the head upon the welding of the annular section to the metal surface.

24. (Cancelled)

25. (Original) The weldable fastener according to Claim 23 wherein said head has an exterior wall having a first exterior radius and said annular weldment area has a second exterior radius equal to the first exterior radius.

26. (Currently Amended) The weldable fastener according to Claim 23 wherein the elongated shank is an ~~eternally~~ externally threaded shank.

27. (Previously Presented) The weldable fastener according to Claim 23 wherein said shank comprises a weakened section portion adjacent to said head.

28. (Canceled)

29. (Original) The weldable fastener according to Claim 24 wherein the first thickness is greater than 1.5 mm.

30. (Original) The weldable fastener according to Claim 24 wherein the first thickness is greater than 2.0 mm.

31. (Currently Amended) An automotive vehicle apparatus comprising:
a laminate panel having first and second metallic layers; and
a ring stud arc welded to the laminate panel, wherein the ring stud is welded to the laminate panel by an annular weldment area, wherein the [[a]] ring stud has a head with a first thickness and an annular weldment area having a second thickness which is less than 50% the first thickness, wherein the head comprises a web portion and wherein said shank has a first failure load, and the web portion has a second failure load greater than the first failure load, said annular weldment area defining a cavity between the web portion and the laminate panel.

32. (Canceled)

33. (Previously Presented) The automotive vehicle apparatus of Claim 31 wherein the ring stud comprises an externally threaded shank coupled to a head.

34-35. (Cancelled)

36. (Previously Presented) The automotive vehicle apparatus of Claim 31 wherein the annular weldment area to laminate panel interface has a third failure load greater than the first failure load.

37. (Original) The automotive vehicle apparatus of Claim 31 wherein the laminate panel is a metal laminate.

38. (Original) The automotive vehicle apparatus of Claim 37 wherein the metal laminate comprises a polymer layer.

39. (Original) The automotive vehicle apparatus of Claim 38 wherein the laminate comprises first and second metallic layers, said polymer layer being disposed between the first and second layers.

40. (Previously Presented) The automotive vehicle apparatus of Claim 36 wherein the annular weldment area to laminate panel interface is partially disposed between the first and second metallic layers.

41. (Previously Presented) The automotive vehicle apparatus of Claim 38 wherein the polymer layer within the annular weldment area couples the first and second metallic layers.

42-47. (Cancelled)

48. (Withdrawn) A method of attaching a ring stud to an automotive vehicle panel, the method comprising:

- (a) positioning the ring stud to contact the automotive vehicle panel;
- (b) conducting an electric current through the ring stud;
- (c) retracting the weld stud from the vehicle panel to form an arc and to create molten metal; and
- (d) plunging the ring stud into the molten metal.

49. (Withdrawn) The method according to Claim 48 wherein conducting an electric current through the ring stud is loading a weldment portion of the stud with an electric current less than 950 amps.

50. (Withdrawn) The method according to Claim 48 wherein the automotive vehicle panel is a metal laminate.

51. (Withdrawn) The method according to Claim 50 wherein the metal laminate comprises a polymer layer.

52. (Withdrawn) A method of attaching a ring stud to an automotive vehicle panel, the method comprising:

- (a) automatically locating the ring stud adjacent the vehicle panel;
- (b) creating an electrical arc between the ring stud and the vehicle panel; and
- (c) welding the ring stud to at least a first metal layer of the vehicle panel while at least partially displacing a polymeric layer of the vehicle panel adjacent the welding area.